MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2320
Gaithersburg, Maryland 20899-2320

SRM Number: 1660a
MSDS Number: 1660a
SRM Name: Methane and Propane in Air

Date of Issue: 24 June 2005

MSDS Coordinator: Mario J. Cellarosi
Telephone: 301-975-6776
FAX: 301-926-4751
E-mail: SRMMSDS@nist.gov

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

Description: This SRM mixture is supplied in a DOT 3AL specification aluminum (6061 alloy) cylinder with a water volume of 6 L. Mixtures are shipped with a nominal pressure exceeding 12.4 MPa (1800 psi), which provides the user with 0.73 m^3 (25.8 ft^3) of useable mixture. The cylinder is the property of the purchaser and is equipped with a CGA-590 brass valve, which is the recommended outlet for this methane/propane mixture. NIST recommends that this cylinder **NOT** be used below 0.7 MPa (100 psi).

Substance: Methane and Propane in Air Compressed Gas Mixture.

Other Designations: Methane (marsh gas; methyl hydride; natural gas)/**Propane** (*n*-propane; dimethyl methane; propyl hydride; propylhydride; liquefied petroleum gas; LPG) in **Air Gas Cylinder**.

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component	CAS Registry	EC Number (EINECS)	Concentration *
Methane	74-82-8	200-812-7	4 µmol/mol
Propane	74-98-6	200-827-9	1 µmol/mol
Air	132259-10-0	not assigned	balance

* Concentration applies to the identified NIST compressed gas cylinder.

Index, R/S Phrases (EU): Not applicable. Refer to Section 15 "Regulatory Information".

3. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0–4): Health = 2 Fire = 0 Reactivity = 0

Major Health Hazards: Difficulty in breathing, central nervous system depression.

Physical Hazards: Cylinder may rupture or explode if exposed to heat.

Potential Health Effects (Short Term Exposure)

Inhalation: Nausea, vomiting, difficulty breathing, irregular heartbeat, headache, drowsiness, fatigue, dizziness, disorientation, emotional disturbances, mood swings, tingling sensation, loss of coordination, suffocation, convulsions, unconsciousness.

Skin Contact: Frostbite.

Eye Contact: Irritation, blurred vision.

Ingestion: Ingestion of a gas is unlikely.

Listed as a Carcinogen/Potential Carcinogen

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs		X
By the Occupational Safety and Health Administration (OSHA)		X

4. First Aid Measures

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration by qualified personnel. Get immediate medical attention. **Note to Physician:** For inhalation, consider oxygen.

Skin Contact: Wash affected skin with soap and water for at least 15 minutes while removing contaminated clothing. If frostbite or freezing occurs wash with lukewarm water (105–115 °F; 41–46 °C). Get medical attention, if needed.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.

Ingestion: Ingestion of gas is unlikely.

5. Fire Fighting Measures

Fire and Explosion Hazards: Negligible fire hazard applicable to the identified NIST cylinder. Cylinder may rupture or explode if exposed to heat. Escaping gas mixture promotes combustion of surrounding materials.

Extinguishing Media: Regular dry chemical, carbon dioxide.

Fire Fighting: Move cylinder from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

METHANE

Flash Point (°C): –223 **Autoignition (°C):** 537 **Method:** Not Applicable

Flammability Limits in Air (Volume %): **Upper:** 15

Lower: 5

Flammability Class (OSHA): Not applicable to the identified cylinder.

PROPANE

Flash Point (°C): –105 **Autoignition (°C):** 450 **Method:** Not Applicable

Flammability Limits in Air (Volume %): **Upper:** 9.5

Lower: 2.5

Flammability Class (OSHA): Not applicable to the identified cylinder.

6. Accidental Release Measures

Occupational Release: Stop leak if possible without personal risk. Isolate hazard area and deny entry. Stay upwind and keep out of low areas. Refer to Section 13, "Disposal Considerations".

7. Handling and Storage

Storage: Store and handle in accordance with all current regulations and standards. Secure cylinder to prevent physical damage. Keep valve protective cap on cylinder when not in use. Keep separated from incompatible substances. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.

Safe Handling Precautions: Wear safety goggles. See Section 8, "Exposure Controls and Personal Protection".

8. Exposure Controls and Personal Protection

Methane Gas

ACGIH TWA (inhalation): 1000 ppm for aliphatic hydrocarbon gases

UK OES (inhalation): simple asphyxiant

Propane

OSHA TWA (inhalation): 1800 mg/m^3 (1000 ppm)

UK OES (inhalation): simple asphyxiant

Ventilation: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Respirator: If necessary, refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators with organic vapor cartridges certified by NIOSH.

Eye Protection: Wear safety goggles. **DO NOT** wear contact lenses in the laboratory. An eye wash station should be readily available near of handling and use areas.

Personal Protection: Wear protective clothing and chemically resistant gloves to prevent skin exposure.

9. Physical and Chemical Properties

Methane	Propane
Appearance and Odor: colorless and odorless	**Appearance, Odor, Taste:** colorless, distinct odor
Molecular Weight: 16.04	**Molecular Weight:** 44.11
Molecular Formula: CH_4	**Molecular Formula:** C_3H_8
Boiling Point (°C): –162	**Boiling Point (°C):** –42
Freezing Point (°C): –183	**Freezing Point (°C):** –190
Vapor Density (air = 1): 0.55	**Vapor Density (air = 1):** 1.55
Volatility (%): not applicable	**Volatility (%):** 100
Solubility in Water: 3.5 % @ 17 °C	**Solubility in Water (%):** very slightly soluble
Solvent Solubility: soluble in alcohol; benzene; ether; organic solvent	**Solvent Solubility:** soluble in alcohol; ether; benzene; chloroform; turpentine

Note: Properties apply to the pure components. Air is not included as it comprises a mixture of inert gases.

10. Stability and Reactivity

Stability: X Stable _____ Unstable

Stable at normal temperatures and pressure.

Conditions to Avoid: Avoid heat, flames, sparks and other sources of ignition. Minimize contact with material. Avoid inhalation of material or combustion by-products. Protect from physical damage. Cylinder may rupture or explode if exposed to heat.

Incompatibilities: Metals, oxidizing materials, halogens, combustible materials, reducing agents.

Fire/Explosion Information: Refer to Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Thermal decomposition or combustion produces oxides of nitrogen and carbon.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: X Inhalation X Skin ____ Ingestion

Methane

Methane gas is a simple asphyxiant.

Propane

Propane gas is a simple asphyxiant

Health Effects (Acute Exposure):

Inhalation of propane to 10,000 ppm caused no symptoms in human subjects. Asphyxia is the principal hazard. The symptoms of asphyxia depend on the rapidity with which the oxygen deficiency develops and how long it continues. In sudden acute asphyxia, unconsciousness may be immediate. With slow development, there may be rapid respiration and pulse, air hunger, dizziness, reduced awareness, tightness in the head, tingling sensations, incoordination, faulty judgment, emotional instability, and rapid fatigue. As the asphyxia progresses, nausea, vomiting, collapse, unconsciousness, convulsions, deep coma and death are possible.

Medical Conditions Generally Aggravated by Exposure: No data available.

12. ECOLOGICAL INFORMATION

Environmental Summary:

No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Compressed Gas, N.O.S.; Methane and Propane in Air; UN1956; Hazard Class 2.2.
Canadian WHMIS: Compressed Gas, N.O.S.; Methane and Propane in Air; UN1956; Hazard Class 2.2.

15. REGULATORY INFORMATION

U.S. REGULATIONS

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21)

ACUTE:	Yes
CHRONIC:	No
FIRE:	No
REACTIVE:	No
SUDDEN RELEASE:	Yes

STATE REGULATIONS

California Proposition 65: Not regulated.

CANADIAN REGULATIONS

WHMIS Classification: Not determined.

EUROPEAN REGULATIONS

EU Classification

Not determined for the identified for the NIST compressed gas cylinder.

EU Risk and Safety Phrases

Not determined for the identified for the NIST compressed gas cylinder.

NATIONAL INVENTORY STATUS

U.S. Inventory (TSCA): Listed on inventory.

TSCA 12(b), Export Notification: Not listed.

16. OTHER INFORMATION

Sources: MDL Information Systems, Inc., MSDS *Mix Methane in Air*, 17 June 2004.
MDL Information Systems, Inc., MSDS *Mix Propane in Air*, 17 June 2004.
MDL Information Systems, Inc., MSDS *Compressed Air, Breathing Air*, 19 March 2003.